UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,307	07/29/2003	Toshiaki Yoshihara	1100.68223	6440

24978 7590 11/03/2004

GREER, BURNS & CRAIN
300 S WACKER DR
25TH FLOOR
CHICAGO, IL 60606

EXAMINER	
SCHECHTER, ANDREW M	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,307	YOSHIHARA ET AL.	
	Examiner	Art Unit	
	Andrew Schechter	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 12* is/are rejected.

7)☒ Claim(s) *10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/29/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 12 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 12 recites that the control voltage for turning on the switching elements is zero. To the examiner, it appears that a zero voltage causes any standard switching element (such as a TFT, for example) to turn off, rather than on. Applying zero voltages to such a switching element would cause the pixel potential to float, so that the desired electric field would not be applied to the liquid crystal. Therefore, the specification does not enable one skilled in the art to make and/or use the claimed invention. Clarification on this question by the applicant would be appreciated.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 8, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by *Hasegawa et al.,* U.S. Patent No. 6,614,491.

Hasegawa discloses [see Figs. 1-3, for instance] a manufacturing method of a liquid crystal display device comprising two substrates [11, 31] sandwiching a liquid crystal [40] having spontaneous polarization; and electrodes [15, 34, etc.] formed on the substrates for applying a voltage to the liquid crystal, the liquid crystal showing a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction when no voltage is applied [col. 5, lines 53-55, etc.]; said method comprising the steps of heating the liquid crystal [col. 5, lines 43-44, etc.]; and applying an electric field with electric field strength of not less than 2 V/μm in vicinity of a transition temperature from a higher temperature phase than chiral smectic C phase to the chiral smectic C phase in an alignment treatment which is performed to obtain the monostable state after heating [col. 5, lines 43-55; the cell gap and liquid crystal thickness is 2 μm, col. 9, line 39, and Fig. 3 shows 7-10 V being applied, so the electric field is 3.5-5 V/μm]. Claim 1 is therefore anticipated.

The electric field strength of the electric field is not less than 3 V/μm, so claim 2 is also anticipated. A temperature range of the vicinity of the transition temperature includes a temperature range of ±2°C from the transition temperature, so claim 3 is also anticipated.

Considering the additional limitations of claim 8, *Hasegawa* also discloses a pixel substrate [11] with pixel electrodes [15], a common substrate [31] with common electrode [34], data lines [16], switching elements [18], scanning lines [12], and applying a control voltage for turning on said switching elements to said scanning lines and applying a DC voltage to said data lines in vicinity of a transition temperature as recited. Claim 8 is therefore anticipated as well.

The electric field strength to be applied to the liquid crystal by the DC voltage is not less than 2 V/μm, so claim 9 is also anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hasegawa et al.,* U.S. Patent No. 6,614,491 as applied to claim 1 above, in view of *Miura et al.,* U.S. Patent No. 6,703,993.

Hasegawa does not disclose necessarily disclose a backlight driven by a field-sequential color scheme, with data-writing and data-erasure scanning voltages. *Miura* does disclose [see Fig. 8 and discussion thereof, etc.] a backlight driven by a field-sequential color scheme, with data-writing and data-erasure scanning voltages. It would have been obvious to one of ordinary skill in the art at the time of the invention to use these in the method of *Hasegawa*, motivated by the desire for a high resolution display and *Miura*'s teaching that doing so allows a full-color image to be effectively displayed without undesired influence from the preceding frame period, thus improving the display image qualities [see col. 6, lines 34-60, for instance]. Claim 7 is therefore unpatentable.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hasegawa et al.,* U.S. Patent No. 6,614,491 as applied to claim 1 above, in view of *Wingen et al.,* U.S. Patent No. 6,605,323.

Hasegawa discloses [col. 9, lines 13-15] a liquid crystal with a phase sequence (from high to low temperature) of isotropic liquid phase – nematic phase – chiral smectic C phase, or I–N–smectic C*, where (*) indicates chiral. Claim 4 recites either I–N*–smectic C* or I–N*–smectic A–smectic C*. (Note that chiral nematic and cholesteric are both N*, being interchangeable terms for this purpose.) *Hasegawa* therefore discloses a different phase sequence than those recited, in particular disclosing N rather than N*.

Wingen discloses an analogous LCD with liquid crystal having spontaneous polarization, and discloses that the phase sequence preferably comprises "isotropic – nematic or cholesteric (N*) – smectic C*" [col. 4, line 45]. This is evidence that the liquid

crystals with the sequence I–N–smectic C* are art recognized equivalents to those with the sequence I–N*–smectic C*. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use a liquid crystal with phase sequence I–N*–smectic C* rather than I–N–smectic C* in *Hasegawa's* method, motivated by the art-recognized equivalency of the two. Claim 4 is therefore unpatentable.

9. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Jones,* U.S. Patent No. 6,307,610 in view of *Jones,* U.S. Patent No. 6,307,610.

Jones discloses [see Fig. 2, etc.] a manufacturing method of a liquid crystal display device comprising two substrates sandwiching a liquid crystal having spontaneous polarization; and electrodes [5, 6], formed on the substrates, for applying a voltage to the liquid crystal, the liquid crystal showing a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction when no voltage is applied, said method comprising the steps of: heating the liquid crystal [col. 5, line 64ff.]; and applying an electric field in vicinity of a transition temperature from a higher temperature phase than chiral smectic C phase to the chiral smectic C phase in an alignment treatment which is performed to obtain the monostable state after heating [col. 6, lines 1-8, abstract, etc.].

Jones does not explicitly disclose the remaining limitation of claim 1, that the electric field strength is not less than 2 V/μm. *Jones* discloses using an AC voltage typically between 0.5 V and 5.0 V [col. 6, line 5] and a liquid crystal thickness about 1-6 μm [col. 4, line 66], which corresponds to a range of electric field strengths from about 0.1 V/μm to about 5 V/μm. This range overlaps the recited range; in such case a *prima*

facie case of obviousness exists [see MPEP 2144.05]. Furthermore, *Jones* teaches [col. 10, lines 48-53] that applying 0 V gave 20% of the desired texture, 0.5 V gave 60%, and 2 V gave nearly 100%. This constitutes a teaching that increasing the applied voltage (and hence increasing electric field strength) is desirable in that it tends to produce more of the desired liquid crystal texture. The electric field strength is therefore a result-effective variable whose optimization would have been obvious to one of ordinary skill in the art at the time of the invention; it would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use an electric field strength in the method of *Jones* which is not less than 2 V/μm. Claim 1 is therefore unpatentable.

Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an electric field strength not less than 3 V/μm, so claim 3 is also unpatentable. A temperature range of the vicinity of the transition temperature includes a temperature range of ±2°C from the transition temperature, so claim 3 is also unpatentable. The liquid crystal shows a phase sequence of isotropic – cholesteric – smectic A – chiral smectic C [see col. 1, lines 19-23], so claim 4 is also unpatentable. There are alignment films formed on the two substrates wherein rubbing directions of the alignment films are equal to each other [col. 5, lines 18-31], so claim 5 is also unpatentable. A pretilt angle of the alignment films is not more than 2° [ξ ~ 1.5°, col. 10, lines 58-60, etc.], so claim 6 is also unpatentable.

Allowable Subject Matter

10. Claims 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device of claim 10, in particular the additional limitation that the control voltage for turning on the switching elements and the DC voltage are at equal potential. Claim 10 would therefore be allowable if rewritten appropriately, as would dependent claim 11.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Schechter
Patent Examiner
Technology Center 2800
12 October 2004